



Short communication

Medical marijuana diversion and associated problems in adolescent substance treatment[☆]Christian Thurstone^{a,*}, Shane A. Lieberman^{b,1}, Sarah J. Schmiede^{b,2}^a Denver Health and Hospital Authority and the University of Colorado Denver, 1155 Cherokee Street, MC 3440, Denver, CO 80204, United States^b University of Colorado Denver, United States

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ABSTRACT

Background: The prevalence of medical marijuana diversion among adolescents in substance treatment and the relationship between medical marijuana diversion and marijuana attitudes, availability, peer disapproval, frequency of use and substance-related problems are not known.

Methods: 80 adolescents (15–19 years) in outpatient substance treatment in Denver, Colorado, completed an anonymous questionnaire developed for the study and the Drug Use Screening Inventory-Revised (DUSI-R). The proportion ever obtaining marijuana from someone with a medical marijuana license was calculated. Those ever obtaining marijuana from someone with a medical marijuana license were compared to those never obtaining medical marijuana with respect to marijuana attitudes, availability, peer disapproval, frequency of use, DUSI-R substance use problem and overall problem score using Chi-Square analyses and independent *t*-tests.

Results: 39 (48.8%) reported ever obtaining marijuana from someone with a medical marijuana license. A significantly greater proportion of those reporting medical marijuana diversion, compared to those who did not, reported very easy marijuana availability, no friend disapproval of regular marijuana use and greater than 20 times of marijuana use per month over the last year. The diversion group compared to the no diversion group also reported more substance use problems and overall problems on the DUSI-R.

Conclusions: Diversion of medical marijuana is common among adolescents in substance treatment. These data support a relationship between medical marijuana exposure and marijuana availability, social norms, frequency of use, substance-related problems and general problems among teens in substance treatment. Adolescent substance treatment should address the impact of medical marijuana on treatment outcomes.

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1. Introduction

Various countries, including Australia, Canada, Germany, the Netherlands and the United States have provisions for medical marijuana (New York Times, 2003). In the United States, fourteen states and the District of Columbia have legalized medical marijuana, and at least 12 other states are considering doing so (Ferguson, 2010). As of June 30, 2010 in Colorado, 95,477 people have their medical marijuana registry identification cards, or medical marijuana license (Colorado Department of Public Health and

the Environment, 2010). This medical marijuana license legally provides individuals with an affirmative defense for the possession of marijuana (Colorado Constitution, 2000).

Such widespread availability of medical marijuana raises concerns about its potential impact on adolescents by altering the drug's availability, perceived harmfulness and social norms (Joffe and Yancy, 2004). These factors are known to contribute to the onset of adolescent marijuana use and relapse following adolescent substance treatment (Department of Health and Human Services, 2003; Brown and Ramo, 2006).

Despite the potential impact of medical marijuana on adolescents, little research has been published on how medical marijuana programs affect teenagers. A survey of 733 child and adolescent psychiatrists in California showed that “with the advent of medical marijuana, my adolescent patients” view marijuana as more beneficial (77%), view marijuana as being more available (90%), have decreased recognition of marijuana-induced short-term memory loss (67%), have decreased recognition of marijuana-induced loss of motivation (70%) and are having more problems complicated by

[☆] Supplementary material containing the questionnaire used in this study can be found by accessing the online version of this paper.

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marijuana use (69%) (Jaffe and Klein, 2010). However, this study is limited by a 14% response rate among the child psychiatrists surveyed. Another survey of 393 adolescents (13–19 years old) (Schwartz et al., 2003) presenting to their pediatricians' office in Ohio and Virginia showed that 55% believed that passage of a medical marijuana referendum in their state "would mean it would be easier for teens to start to smoke marijuana recreationally."

In view of the published literature, current research gaps include surveying teens about their abuse and diversion of medical marijuana and evaluating the potential impact of medical marijuana on youth in substance treatment. To address these research gaps, this study presents the results of a survey about medical marijuana administered to 80 adolescents in substance treatment.

1.1. Aims

(1) To conduct a preliminary evaluation of the prevalence of medical marijuana diversion among teens in substance treatment. (2) To explore the hypothesis that adolescents exposed to medical marijuana, compared to those with less exposure, would report greater availability, less perceived harmfulness, less peer disapproval, more frequent use of the substance and more substance-related problems.

2. Method

2.1. Participants

Participants were 80 consecutive admissions to an urban, outpatient adolescent substance treatment program in Denver, Colorado. The substance treatment program is a state-licensed program located at a safety-net hospital and provides 12 weekly sessions of individual and family treatment. Half of the program's referrals come from juvenile justice and the rest from primary care, schools and self-referral. The majority of referrals receive public assistance. Inclusion criteria were: (1) ages 15–19 years; (2) enrolled in the adolescent substance treatment program; and (3) willingness to complete the research questionnaires. The exclusion criterion was inability to read and complete the English-language survey.

2.2. Measures

The measures include a demographic questionnaire, the Drug Use Screening Inventory-Revised (DUSI-R) (Tarter, 1990) and a 6-item questionnaire about medical marijuana attitudes, availability and social norms.³ The DUSI-R used in the study is a 149-item, self-report, pen-and-paper questionnaire that contains ten sub-scales, including a substance use problem sub-scale. The instrument has been shown to be reliable and valid in various adolescent samples (Kircsi et al., 1995; Tarter and Kircsi, 2001). A problem density score is calculated for each sub-scale and the instrument as a whole by dividing the number of problems reported by the number of items in the sub-scale or entire instrument. This number is then multiplied by 100. Therefore, scale and sub-scale scores range from 0 (no problems) to 100 (maximum problems). The frequency of marijuana use was assessed with the DUSI-R question: "Ordinarily, how many times each month have you used marijuana in the past year?" Response categories are 0 (0 times), 1 (1–2 times), 2 (3–9 times), 3 (10–20 times) or 4 (more than 20 times). The DUSI-R was used to compare the overall problem density score of this sample to published reports of other samples of adolescents with substance use disorders and to evaluate the relationship between medical marijuana exposure and frequency of marijuana use, substance use problem severity and overall problem severity. The medical marijuana self-report, pen-and-paper questionnaire was created for the study and includes questions about access, perceived harmfulness and social norms that were adapted from the Monitoring the Future Study (Johnston et al., 2010). The exact instrument is included as supplementary material. To enhance confidentiality, participants were specifically instructed not to write their names on the questionnaire and no identifying information was collected. The participants were made aware that neither therapists nor parents/guardians would know the results of the survey.

2.3. Procedures

Approval was obtained from the Colorado Multiple Institutional Review Board prior to beginning the study. Participants expressing interest in the study were referred to the research study by their substance treatment therapists. Participants

received a verbal and written explanation of the study. By completing the survey, the adolescent participants provided their own implicit assent/consent to participate. All participants completed the questionnaire at some time during their 12 weekly sessions of substance treatment. Each participant was reimbursed \$10 for the time and effort to complete the questionnaire. Participant recruitment took place from June 2010 through January 2011.

2.4. Statistical analyses

Data were analyzed using SAS software Version 9.2 (SAS Institute, 2008). Descriptive statistics were used to describe the entire sample in terms of DUSI-R substance use problem and overall problem score. DUSI-R scores were used only for participants who completed the entire scale or relevant sub-scale. Chi-square analyses and independent *t*-tests were used to compare those with and without medical marijuana diversion in terms of age, gender, ethnicity and race. Because of the sample size, to compare those getting and not getting marijuana from someone with a medical marijuana license, the racial categories were dichotomized into white and non-white. For the first aim to evaluate the extent of medical marijuana diversion among teens in substance treatment, descriptive statistics were used to describe the proportion of participants who had ever obtained marijuana from someone with a medical marijuana license. For the second aim to explore the relationship between medical marijuana exposure and marijuana attitudes, availability, peer disapproval, frequency of use, substance use problems and overall problems, the sample was divided into those ever obtaining marijuana from someone with a medical marijuana license and those never obtaining marijuana from someone with a medical marijuana license. Using Pearson Chi-Square analyses, these groups were compared in terms of: (1) the proportion reporting great risk with using marijuana regularly, (2) the proportion reporting very easy access to marijuana, (3) the proportion reporting their friends do not disapprove of regular marijuana use and (4) the proportion reporting more than 20 times per month of marijuana use. Categorization of outcomes is consistent with the analyses of the Monitoring the Future Study (Johnston et al., 2010). The categorical variables were also maintained to facilitate interpretation of the study results. The DUSI-R substance use problem score and overall problem score were compared between the participants ever and never getting marijuana from someone with a medical marijuana license using independent *t*-tests.

3. Results

3.1. Sample description

Eighty youth participated in the study and 5 refused to participate. The average age of the sample was 16.5 years (*SD* = 1.1, range 15–19 years), and 77.5% (*N* = 62) were male. Forty-six participants (57.5%) reported Hispanic/Latino ethnicity. Eleven participants (13.75%) reported African American race; 22 (27.50%) reported Caucasian race; and 47 (58.75%) reported more than one, other or unknown race. Seventy-three of 80 participants (91.3%) reported being in treatment for marijuana, and all had a lifetime history of marijuana use. 61 of 77 (79.2%) met the DUSI-R substance problem cutoff score of 15, indicating the need for further evaluation for a substance use disorder (Kircsi et al., 2008). Of those with complete data regarding frequency of marijuana use (*N* = 78) the number (%) using marijuana 0 times, 1–2 times, 3–9 times, 10–20 times and more than 20 times per month in the last year was: 7 (9.0%), 5 (6.4%), 4 (5.1%), 8 (10.3%) and 54 (69.2%), respectively.

3.2. Diversion of medical marijuana

Thirty-nine of 80 participants (48.8%) reported ever obtaining marijuana from someone with a medical marijuana license. None reported having their own medical marijuana license.

3.3. Correlates of medical marijuana exposure

Table 1 shows the comparisons between those who did and did not report getting marijuana from someone with a medical marijuana license. The groups did not differ significantly in terms of age or the proportion who were male, Hispanic/Latino, non-white or who perceived great risk with regular marijuana use. Compared to those never obtaining marijuana from someone with a medical marijuana license, those ever obtaining marijuana from someone

³ This questionnaire appears as supplementary material.

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